Comment on essd-2021-18

Anonymous Referee #2

General comments

The paper presents an overview of goals, design, the proceeding and first outcomes of EUREC^{4}A project conducted in January and February 2020 in the vicinity of Barbados island on Atlantic trade winds region. Observations merged measurements conducted in the atmosphere (trade wind clouds) and in the ocean in wide span of time and space scales. The ultimate goal of the campaign was to improving our understanding of how the global warming could affect the trade wind clouds.

EUREC^{4}A was undoubtedly the more complex and exhaustive observation campaign conducted ever. It is not common to review a paper describing such a complex experiment, probably because it is the first publication that engages with the challenge to present in a concise way such diverse measurements. Being specialist on atmospheric physics I won't pretend that I understood all subtleties of ocean measurements. However, the paper offers a fluent narrative that allows even a non-specialist to catch the main ideas of observations performed. Still, I have few suggestions that could improve the overall understanding of the project (see below).

Specific comments:

Figures give a general overview of a kind of measurements performed during the experiment. Very often they are very complex and I think that they deserve more descriptions. I understand that those figures should give only an overview of what was observed, however a huge diversity of data make it difficult to understand for non-specialists (as atmospheric scientists versus oceanic scientists). I would appreciate if more attention is given to explain in some general yet concise manner what message could be inferred from those measurements.

Technical remarks:

p.4 Abstract, line 5; 'or' used twice.

p.5 l. 30: 'to RICO' should be probably 'and RICO'

Figure 2, what is really shown in this figure? Is it a composition of all flights, dropsondes patterns, radiosonde soundings from the whole experiment? Colors in the figure don't correspond exactly to the colors in the legend…. Or it is only me that cannot see correctly.

Figure 8, the scale for the isentropic lapse rate is missing, or I cannot see where it is. Or the dashed line does not represent a lapse rate?

p. 18, l. 268-269: 'eighteen coordinated (4h flight segments)' …. Should 'segments' be outside the parantheses?

Figure 11 deserves a legend more 'compatible' with descriptions in different parts of the figure. For instance: in the figure we see 'CloudKite hologram' that is described as MPCK+ in the legend.

p. 22 l 329: Prospero and Carlson, 2020, NOT 'J M Prospero….'

p. 35 l. 535: 'Holland' should be 'The Netherlands'